

masterly and exhaustive critique of the subject from an analytical point of view, and his discussion of Helmholtz's axioms is particularly instructive.

The third part of the tract consists of two notes—one developing the metrical formulæ of elliptic geometry, and the other dealing with planetary motion in elliptic space, with a law of attraction expressed by the formula $P = \frac{\mu}{k^2} \operatorname{cosec}^2 \frac{r}{k}$, where k is the absolute constant of the space considered. The results are, in some respects, curiously analogous to the Newtonian ones; but there are also striking differences—for instance, the uniform description of areas about the centre of force does not hold good.

Mr. Frankland's critique deserves a wide circulation, and will doubtless do much to make the general public more familiar with what is, after all, a matter of great philosophical interest, that can be explained, apart from demonstration, to any intelligent person. There is no reason at all why a schoolboy, who has made some progress in geometry, should not be made acquainted with the main characteristics of the three possible systems, and realise, to some extent, the transformation so recently undergone by the oldest of the sciences.

G. B. M.

FOREST FLORA OF THE BOMBAY PRESIDENCY.

Forest Flora of the Bombay Presidency and Sind. Vol. i., Ranunculaceæ to Rosaceæ. By W. A. Talbot. Pp. vi+508+xxvi. (Poona: Printed by Government at the Photozincographic Department, 1909.)

IN 1894 Mr. W. A. Talbot issued a useful "List of the Trees, Shrubs, and Woody Climbers of the Bombay Presidency." A new and improved edition of this "List" appeared in 1902. In the present work Mr. Talbot has supplied what is essentially a more complete and considerably enlarged edition of the "List," with full accounts of all the species included, and illustrations of the more important ones. Those using the "List" will find full accounts of the species it includes in Dr. T. Cooke's "Flora of the Bombay Presidency"; the main purpose of this "Forest Flora" we may, therefore, assume to be the provision of an illustrated work of reference for Bombay comparable with the "Flora Sylvatica" which Col. Beddome prepared for Madras forty years ago. If this assumption be correct, the provision of yet another series of plant descriptions, marked as they are by all the care and accuracy which characterise Mr. Talbot's work, cannot be said to be supererogatory.

The quarto size seems to have been adopted in order to render the "Flora" uniform with the corresponding work for southern India rather than because of the nature of the illustrations, only two of which occupy the whole of a page. It seems, therefore, doubtful whether Mr. Talbot is right in thinking that the size of the work has been kept as small as possible, or justified in hoping that it may not prove too unwieldy for transport in the baggage of a forest or district officer.

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The text is clearly and carefully printed, but the glazed paper used is heavy, unpleasant to handle and to look at, and does not promise to be durable in damp localities. No doubt this type of paper has been chosen on account of the process employed in the reproduction of the illustrations, which, unfortunately, as matters stand, are the least pleasing portion of the work. The drawings made use of have not lent themselves at all well to reproduction by the process adopted, a statement of fact which involves no reflection either upon the process or upon the drawings. These, indeed, one can readily imagine to have been pleasing in their original form, though they have the disadvantage of falling short of what is desirable in a work of this kind, since for the most part they do no more than display the habit of the species illustrated, and rarely include analyses of the flower.

APPLIED CHEMISTRY.

Chimica Generale e Applicata all' Industria. Vol. ii.: *Chimica Organica.* By Prof. Ettore Molinari. Parte i.: pp. xvi+416; parte ii.: pp. xii+417 to 979. (Milan: Ulrico Hoepli, 1908-9.) Price 21 lire the 2 vols.

THE volumes with the above title form a supplement to the treatise on inorganic chemistry by the same author, already reviewed in NATURE (vol. lxxi., p. 339). The same general plan has been followed in these later volumes as was adopted in the case of inorganic substances, the treatise differing from nearly all other smaller treatises on organic chemistry in giving very full details of industrial operations. The book is not, however, a treatise on technology in the narrower sense of the word, the theoretical side being by no means neglected. A very great deal of thoroughly up-to-date information of processes and plant is imparted, but at the same time there is due regard to the theory of the operations. The work is excellently illustrated with cuts of the latest kinds of machinery. An idea of the character of the work may be conveyed by stating that sixty-five pages of small print are devoted to the manufacture of sugar, and that the processes involved are described clearly but concisely, the illustrations being very well chosen. Such a work must necessarily prove of good service to students who intend to devote themselves to industrial chemistry and are desirous of becoming acquainted with general manufacturing operations. There are many signs that the author has spared no pains to make himself acquainted with the latest facts and processes, references in some cases being given to results brought before the recent International Congress of Applied Chemistry in 1909.

It is nowadays obviously impossible for any one individual to give an authoritative account of all the different branches into which industrial chemistry is subdivided, and in such a work as that under review it would, no doubt, be easy for specialists to detect several errors. Thus, for example, the 1898 Goldenberg process of analysis of tartaric acid material described on p. 451 was superseded by the 1907 process,

and this was again modified in 1909. Certain statistical information given is, too, of doubtful correctness. Names are frequently misspelt. But putting aside minor blemishes of this kind the work is of a decidedly useful nature, and, like the inorganic portion, to be commended. It may be noted that a German translation of the whole work is in progress, so that it may shortly become more accessible to the English student.

W. A. D.

OUR BOOK SHELF.

Guide to the Crustacea, Arachnida, Onychophora, and Myriopoda exhibited in the Department of Zoology, British Museum (Natural History). Pp. 133; 90 illustrations. (London: Printed by order of the Trustees of the British Museum, 1910.) Price 1s.

THIS "Guide" admirably fulfils its functions; it is written in a clear style, and indicates tersely the main points of interest associated with the chief families and genera. The principal characters of each subdivision—class, order, tribe, family—are concisely stated, and those of its members are selected for mention which most aptly illustrate points in morphology or distribution, or show some striking habit. The section on the Crustacea opens with a short account of the lobster, its external features and appendages, internal organs, development, moulting, and the asymmetry of its chelæ. Short notes are added on the modifications caused by parasites and on adaptations to environment.

The systematic account of the Crustacea, in addition to stating the characters of each subdivision, contains a large number of interesting references to morphological and distributional points which make it valuable apart from the special purpose for which it was prepared. To give two instances—(1) the formation of a respiratory siphon which takes place in the Albuneidæ by apposition of the antennules, but in Corystes by association of the antennæ; and (2) the appearance of Apus in Scotland in 1907, which is ascribed to the introduction of the eggs, perhaps on the feet of birds, from the Continent. The Arachnida, including Limulus and the Eurypterines, and the Myriopoda are dealt with in a similarly interesting manner, and short notes are added on the Trilobita, Pycnogonida, Pentastomida, and Onychophora. A little more space might well have been devoted to the Ixodidæ, in view of their great importance in connection with the spread of disease in man and animals. The illustrations, many of which are new and are prepared from photographs of the specimens exhibited, are excellent, and well support the text.

Popular Astronomy. By the late Prof. Simon Newcomb. Pp. xx+580+5 star maps. (London: Macmillan and Co., Ltd., 1910.) Price 8s. 6d. net.

ASTRONOMY has no doubt made progress in several directions since the late Prof. Newcomb revised his renowned work; nevertheless, if the lamented author were alive to re-write his book at the present time, by far the greater part could not be improved upon. The extensions of knowledge take place at the frontiers of a science, while the main body of fact and principle remains unaltered. While, therefore, this cheap edition of Prof. Newcomb's "Popular Astronomy" is issued without additions referring to recent developments, the volume can fairly be described as one of the most lucid and authoritative statements of the foundations of astronomical science available even

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now. To let such a work pass out of print would have been a misfortune, and we trust that the issue of an edition at less than half the original price will be the means of making many new readers familiar with its merits.

Naturwissenschaftliches Unterrichtswerk für höhere Mädchenschulen. Teil iv., Lehrstoff der iv. Klasse. By Dr. K. Smalian and K. Bernau. Pp. 152. (Leipzig: G. Freytag, 1910.) Price 2.50 marks.

THIS volume, one of a series graded for successive school classes, has been prepared to comply with official regulations, wherein presumably lies the reason for combining a triad admixture of botany, zoology, and mineralogy. The aim of the authors has been directed less towards a training manual and more towards providing a compendium of information on objects which are met with in daily life. The book contains an accurate but condensed collation of facts concerning cryptogamic and economic botany, the zoological groups of mollusca, vermes, and coelenterata, and common or useful minerals. It is plentifully illustrated with good text-figures and a dozen coloured plates.

LETTERS TO THE EDITOR.

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of NATURE. No notice is taken of anonymous communications.]

Pwdré Ser.

IN my former communication on this subject I gave all the information I had been able to collect respecting the popular belief as to the masses of white jelly found in my experience on mountain pastures, but, according to the observations of others, on different kinds of ground and at various seasons.

I recently procured a specimen of the jelly, and quoted a letter from Mr. Arber, to whom I had sent it, giving the opinion of Mr. Brookes, to whom Mr. Arber had referred it. After that was written I received the following note from Mr. Brookes, under the date April 4:—"The 'jelly' had been gathered several days before it reached me, and hence its condition was not suitable for examination, several putrefactive organisms having begun to flourish upon the jelly in the meantime. The remains of the substance which I saw seemed to be most like the zoogloea stage of some bacterial organism or the plasmodium of a myxomycete. The 'jelly' itself had no cellular structure. There was no nostoc present or any allied organism."

More recently I received a specimen which Mr. Burnett, headmaster of the Grammar School at Kirkby Lonsdale, found in the Rawthay Valley, some miles above Sedburgh. This also I sent to Mr. Brookes, who writes (July 26) that "the jelly-like mass sent from Kirkby Lonsdale is undoubtedly the plasmodium of a myxocete," and adds that he is "keeping it to see whether it will give rise to spores."

Mr. Worthington Smith, in a letter dated June 24, says:—"Perhaps you will find the substance so accurately described by you in this week's NATURE under the generic name of Zoogloea; the name as a genus may be obsolete now, but I think that in past times it was placed amongst the algæ, perhaps near Nostoc, and afterwards included in the Schizomycetes. However this may be, I know the substance very well, and I have often had it sent on to me in the past (when I used to answer correspondents for some of the horticultural papers) as a fungus—a Tremella—difficult to trace. I have heard it, as well as Nostoc, associated with fallen stars amongst rustics."

These authorities, as well as Miss Fry (NATURE, June 30),